

Application No.: 09/901,500

Docket No.: JCLA7208

REMARKS**Present Status of the Application**

The Office Action rejected claims 1-7, 13-18 and 20 under 35 U.S.C. 103(a), as being obvious over Takahashi (U.S. 4,400,438) in view of Watanabe et al. (U.S. 3,936,575) and Delgadillo (U.S. 4,313,995; newly cited). The Office Action also rejected claims 8 and 19 under 35 U.S.C. 103(a), as being obvious over Takahashi (U.S. 4,400,438) in view of Watanabe et al. (U.S. 3,936,575) and Delgadillo (U.S. 4,313,995; newly cited) as applied to claims 1 and 13 above, and further in view of Yates (U.S. 6,270,648). Applicants have amended claims 1 and 13. After entry of the foregoing amendments, claims 1-8,13-20 remain pending in the present application. Reconsideration of those claims is respectfully requested.

Discussion of Office Action Rejections

The Office Action rejected claims 1-7, 13-18 and 20 under 35 U.S.C. 103(a), as being obvious over Takahashi (U.S. 4,400,438) in view of Watanabe et al. (U.S. 3,936,575) and Delgadillo (U.S. 4,313,995; newly cited).

Applicants respectively traverse the rejections for at least reasons set forth below.

Nevertheless, Applicants have amended claims 1 and 13 to further define the present invention. Claims 1 and 13 as amended read as follows:

1. A method of laminating copper foil onto a substrate of printed circuit board, the steps of the method comprising:

providing a substrate having an upper surface and a lower surface, *wherein a circuit is formed on at least one of the upper and lower surfaces of the substrate;*

coating isolating material onto the upper surface and the lower surface of the substrate by using a rolling process;

performing a curing process to allow the isolating material to form isolating layers with a predetermined thickness on the upper surface and the lower surface of the substrate; and

laminating metal foils onto the isolating layers formed on the surfaces of the isolating layers, *wherein the thickness of the isolating material is determined according to the type of the metal foil.*

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13. A method of laminating copper foil onto a substrate of a printed circuit board, the steps of the method comprising:

- providing a substrate having an upper surface and a lower surface, *wherein a circuit is formed on at least one of the upper and lower surfaces of the substrate*;
- coating isolating material onto the upper surface and the lower surface of the substrate by using a rolling process;
- performing a curing process to allow the isolating material to form isolating layers with a predetermined thickness on the upper surface and the lower surface of the substrate;
- laminating metal foils onto the surfaces of the isolating layers, *wherein the thickness of the isolating material is determined according to the type of the metal foil*; and
- performing heating and pressurization processes to secure the metal foils to the surfaces of the isolating layers.

Takahashi et al., Watanabe et al., and Delgadillo et al. at least do not teach or suggest the above emphasized features of claims 1 and 13. Specifically, none of the citations discloses that the substrate has a circuit formed on its surface and an isolation material is coated onto the substrate surface having the circuit thereon. Takahashi et al. disclose impregnating a base material with a varnish. Then drying the impregnated base material and bonding one or two copper foils onto the impregnated base material. However, Takahashi et al. do not teach or suggest that the base material has a circuit thereon prior to bonding the copper foils. In the Watanabe reference, the insulating fibrous base materials to be used are glass cloth, glass mat which is impregnated with varnish in a roll-coating zone. (col. 9, lines 33-52). Watanabe et al. do not teach or suggest that the base material has a circuit thereon prior to bonding the metal foil. Delgadillo et al. do not teach or suggest that the impregnated substrate 36 has a circuit thereon prior to bonding the conductive sheet of copper 10.

Further, none of the cited references teaches or suggests that the thickness of the isolating material is determined according to the type of the metal foil. As taught in the specification of the present application, the thickness of the isolating layer can affect the radio frequent properties of the PCB, especially when the isolating layer is located between a circuit layer and a metal layer. The cited references are silent about the thickness of the isolating layer and its effect to RF properties.

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The Office Action asserted that Delgadillo et al. (U.S. 4,313,995) teach impregnated sheets of insulating materials such as glass, cloth or glass mat with prepolymer resin. Delgadillo et al. further suggest sufficient impregnating resin is utilized so that a surface layer is formed on the substrate for adhering a metal sheet thereto.

However, Delgadillo et al. do not teach or suggest that the thickness of the isolating material is determined according to the type of the metal foil. Delgadillo et al. teach that sufficient impregnating resin is utilized so that a surface layer is formed on the substrate for adhering to the treated metal circuit pattern. Clearly, the sufficient impregnating resin is utilized for providing better adhering between the substrate and the metal circuit pattern. Therefore, Delgadillo et al. do not teach or suggest that the thickness of the isolating material is determined according to the type of the metal foil.

For at least the foregoing reasons, claims 1 and 13 are not obvious over Takahashi in view of Watanabe et al. and Delgadillo. For the at least same reasons, dependent claims 2-7, 14-18 and 20 patently define over the prior art as well.

The Office Action rejected claims 8 and 19 under 35 U.S.C. 103(a), as being unpatentable over Takahashi (U.S. 4,400,438) in view of Watanabe et al. (U.S. 3,936,575) and Delgadillo (U.S. 4,313,995; newly cited) as applied to claims 1 and 13 above, and further in view of Yates (U.S. 6,270,648).

Yates is cited to show that different treatments are known to produce high profile, low profile or reverse copper foils. However, Yates cannot cure the deficiencies of Takahashi, Watanabe and Delgadillo as discussed as above. Thus, claims 1 and 13 as well as their dependent claims 8 and 19 are patentable over Takahashi, Watanabe, Delgadillo, and Yates.

CONCLUSION

For at least the foregoing reasons, it is believed that pending claims 1-8, 13-20 are in proper condition for allowance. If the Examiner believes that a telephone conference would

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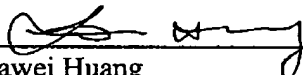
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expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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